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COMMERCIAL POSSIBILITIES  
OF THE OIL FIELD AT HALF MOON BAY,  
SAN MATEO COUNTY,  
CALIFORNIA.

By

Eric A. Starke.

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October 14th, 1921.

COMMERCIAL POSSIBILITIES OF THE OIL FIELD

AT HALF MOON BAY,

SAN MATEO COUNTY, CALIFORNIA.

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History:

The presence of oil seepages and brea beds within the district bordering Half Moon Bay was known to the Indians and the early Spanish immigrants of the San Mateo Peninsula. During the early days the asphalt was mined near Purisima and used for roofing purposes by both the Americans and the Spanish settlers.

In the year 1872 the first deep well was drilled for oil in Pennsylvania, and following the success of this venture, a general interest in the commercial possibilities of the industry was aroused in all parts of the country. In the year 1890 or thereabouts some private parties and also the Pacific Coast Oil Company undertook the exploitation of the Half Moon Bay District and some test wells were drilled. Owing to the meager knowledge at that time regarding the geological conditions governing the accumulation of petroleum, these wells were unfavorably located and they met with limited success. Most of these wells, in accordance with the Eastern practice, were located close to the seepages. Notwithstanding the many handicaps at the time, some fair results were obtained and a number of small wells were found which proved the existence of a high gravity oil. A combination of the imperfect drilling methods at this time together with the low prices offered for oil finally caused these ventures to be abandoned.



#### Discovery of Kern Fields:

Had it not been for the wonderful discoveries in Kern County and Southern California in the eighteen-nineties, very likely the Half Moon Bay Region would already have received the attention it deserves. However, when the large fields of Kern County, with their tremendous gushers, were discovered, all interest in small fields was soon forgotten by the public. Financial interests were naturally attracted by these discoveries affording gigantic possibilities, and it followed that all small fields were rendered unattractive by comparison. In consequence of the large wells discovered, the supply of oil exceeded the demand and the market price dropped to a very low level and continued low until the entrance of the United States into the World War.

As a result of the war, the demand for petroleum products, both for domestic consumption and exportation reached a point far above normal. Thus, development work was stimulated with the result that many small fields in the state now receive recognition. Particularly is this true of all small fields that produce light crude and are near transportation facilities and markets.

#### Attractive location:

Among the attractive small fields of the state, the Half Moon Bay area must be considered as an important factor for its future possibilities. It possesses certain features of a geographical nature which would make it one of the most valuable oil properties in the state if oil in commercial quantities is developed.

The commercial importance of the Half Moon Bay area lies entirely in its unusual location near the city and port of San Francisco. It



is some thirty five miles distant from the heart of the city, and - what is equally important - is on the State Highway. The importance of this location cannot be overestimated, as the most vital factors in the development of petroleum fields are transportation and marketing facilities.

#### State Highway:

In the Half Moon Bay District the transportation problem is solved by the State Highway, and likewise the marketing of the crude and refined products is taken care of by this crowded artery of motor travel. The crude oil can be either refined at the wells and the products sold direct to the retail trade on the highway, or the crude can be loaded in tank wagons and hauled to the suburbs of San Francisco where a ready market exists.

#### High Gravity of Oil:

The petroleum found at Half Moon Bay is of a quality that is not exceeded by any in the State of California. The quantity of gasoline and light fractions in the oil is in excess of that derived from any other California crudes. In this respect the oil compares with the best products of the Eastern and Mid-Continent Fields. It is this large content of valuable products, together with the unusual marketing facilities, that makes the Half Moon Bay District worthy of exploitation.

#### Refining Necessary:

To realize the full value of the oil, in view of the small production of the wells, refining must be resorted to. The oil, of course, could be sold to the refining companies at a high price, but it would not bring the values that can be secured by directly refining and marketing the products.



### Nature of Refining Process:

The refining process necessary is not complicated or expensive and consists in separating the light oils from the crude. The apparatus required consists of a still and a condenser with receiving tanks. Refineries of this type are generally known as Topping Plants, the products made being crude distillates which are sold as such on the market.

Since the products are to be marketed in the neighborhood, there will be no necessity for a barreling and casing plant. All that will be required is storage tanks and tank wagons. It is reasonably supposed that one good truck with a capacity of thirty five barrels could distribute one hundred barrels per day to the neighboring retailers.

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### ANALYSES: (Half Moon Bay Crudes.)

The crudes obtained from the Emerson and O'Brien wells have been examined and the following analyses were obtained. Both samples contained a trace of colloidal paraffin and asphalt.

<u>EMERSON</u>			:	<u>O'BRIEN</u>		
Gravity of Crude 44.7° Be.			:	Gravity of Crude 44.6° Be.		
			:			
			:			
Gasoline	<u>Per-cent</u> 70.1	<u>Gravity (Be)</u> 54.4°	:	Gasoline	<u>Per-cent</u> 60.2	<u>Gravity (Be)</u> 54.3°
Stove Oil	12.2	32.9°	:	Stove Oil	27.1	36.0°
Residuum	16.2	15.9°	:	Residuum	11.2	15.8°
Loss	1.5(Sand, water &c.)		:	Loss	1.5(Sand, water &c.)	
	<u>100.0%</u>		:		<u>100.0%</u>	
			:			



Average analysis of the crudes:

Average Gravity 44.6° Be.

	<u>Per-cent</u>	<u>Gravity (Be)</u>
Gasoline	65.1	54.3°
Stove Oil	19.6	34.4°
Residuum	13.8	15.8°
Loss	1.5 (Sand, water &c.)	
	<u>100.0%</u>	

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Market Value of Refinery Products:

Gasoline	.....	23¢	per	gallon
Stove Oil	.....	9¢	"	"
Residuum	.....	9¢	"	"

Total Market Value of Products Obtained from 100 Gallons Crude Oil:

65.1 Gal. gasoline	@\$.23 per Gal.	\$14.973
19.6 " stove oil	@ .09 " "	1.764
13.8 " residuum	@ .09 " "	1.242
		<u>\$17.979</u>

Value of products from 1 bbl. (42 gal.) crude = \$7.55  
(42/100 times 17.979 = 7.55)

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Costs of Production: Marketing:

The cost of producing has been arbitrarily fixed at One Dollar (\$1.00) per barrel, with an additional cost of One Half Dollar (\$.50) per barrel allowed for topping.

The cost of Marketing at Five Cents (\$.05) per gallon is likewise an arbitrary figure. All of these estimates may be too high, but it is believed that they are well within the bounds.



The cost of producing and marketing will naturally depend upon the volume of production. For the purposes of this report, a production of One Hundred (100) barrels per day has been assumed.

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Actual cost figures for 100 barrel production:

Cost of producing 100 bbl. @ \$1.00 per bbl. ...	\$100.00
Cost of refining " " " .50 " " ...	50.00
Cost of marketing " " " 2.10 " " ...	210.00
Royalty of 1/8 on present standard market price of \$2.45 per bbl. = \$.3062 .	
Royalty on 100 bbl. ...	30.62
(The present standard market price for 44° Be. oil is \$2.45 per bbl.)	
Total cost for 100 barrels .....	<u>\$390.62</u>

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Financial Balance: Production Profits: (Per day.)

Market Value of 100 barrels crude .....	\$ 755.11
Cost (Production & Marketing) .....	<u>390.62</u>
Remainder .....	<u>\$ 364.49</u>

Returns for One Year:

Production for 365 days = 36,500 bbl.	
Market Value at \$ 7.55 per bbl. .....	\$ 275,615.15
Cost of producing, etc. ....	<u>142,576.30</u>
Balance for year .....	<u>\$ 133,038.85</u>

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From this remainder there must be deducted the interest on the



money invested, amortization charges, taxes, office and executive expenses.

#### Drilling Costs:

The cost of drilling new wells at Half Moon Bay is an unknown factor. While the cost of drilling the present shallow wells was probably very low, it is impossible to figure exactly what a well located on the new structure will cost.

If the present cost of drilling in the Kern River Field is taken as a standard, then the cost of a one thousand foot well will be in the neighborhood of \$10,000. Ten dollars a foot should be a conservative figure, however experience has proven that the first well always costs more than all subsequent wells.

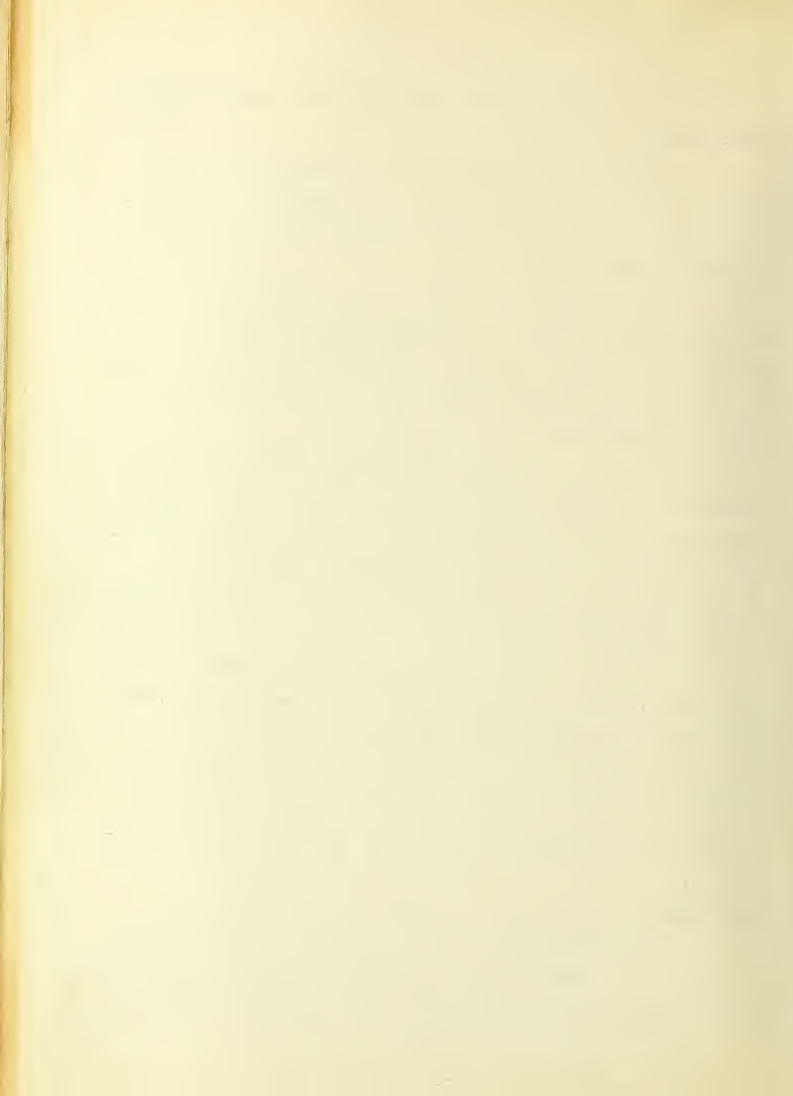
The number of wells that will be required to produce 100 barrels per day cannot be stated because the present wells cannot be considered as demonstrating anything other than that the oil exists in commercial quantities. It must be considered that a well producing daily two barrels of oil worth \$7.55 a barrel is a commercial success, and particularly so when the hole is only 400 feet deep.

In the event of large operations, it will be necessary to install machine shops, purchase tank wagons and erect houses for the workmen, for which an investment approximating \$50,000 will be required.

A refinery capable of handling 100 barrels of oil per day will cost \$25,000. The only items that cannot be determined beforehand are the general expenses including interest, taxes and office and executive expenses.

#### CONCLUSIONS:

The geological report made by H. L. Taliaferro of the Half Moon Bay District is a favorable report. It shows the presence of a well defined anticline and organic shales of Pliocene Age. The thickness and extent of



the organic shales is great enough to warrant the belief that a fair sized Field exists comparable with the highly profitable Ventura Fields.

Many wells have been drilled in the past in the Half Moon Bay District with limited success. The absence of any marked success may be ascribed to the following causes:

1. All development work has been done in an empirical manner and without regard for the essential geological conditions of structure.
2. All wells were located near the seepages. Not a single well has been drilled to test out the prominent anticline located and described in Taliaferro's Report.

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The Purisima Anticline is a well defined fold which separates the area into two divisions; the eastern or developed part, and the western. All of the seepages are to the east of the anticline. No seepages are known on the western flank of the fold. Whether or not oil exists on the west flank can only be determined by the drill. Q.E.D.

That oil does exist in the area between the crest of the anticline and the seepages appears certain from the development.

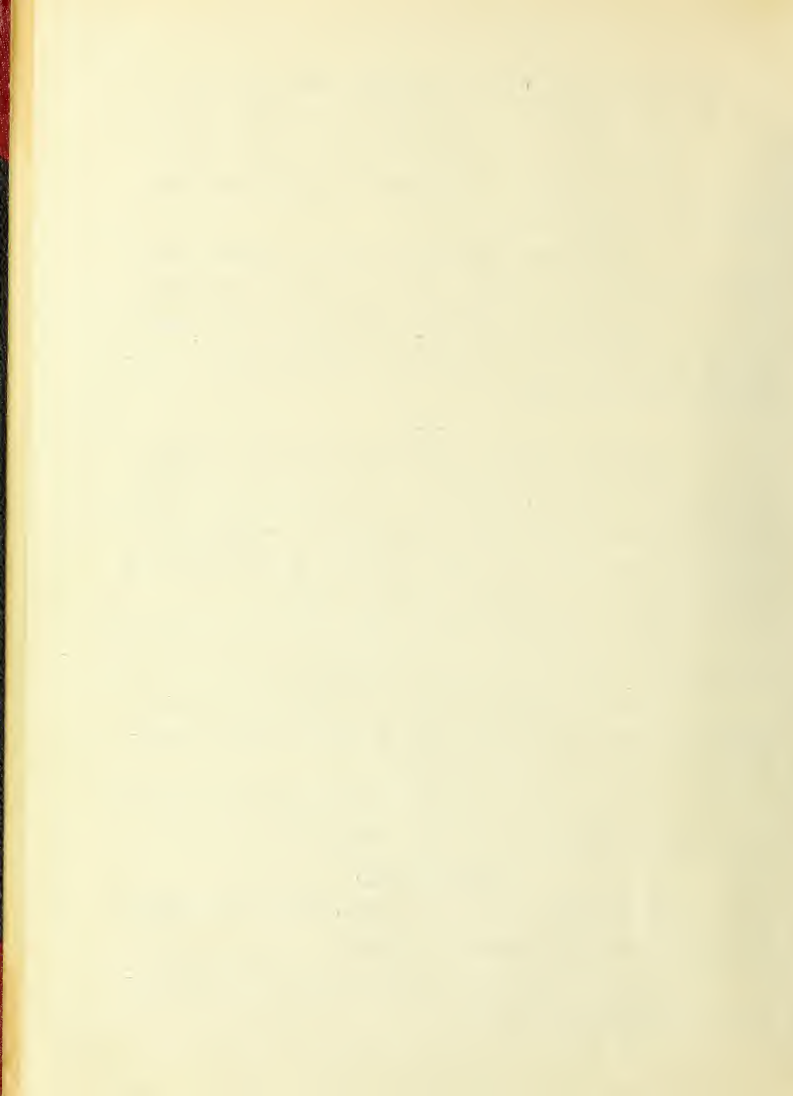
The probabilities are in favor of the belief that oil will be found on the western flank but this cannot be predicted purely on structural grounds. The drill alone must decide.

It is the opinion of the writer that oil in commercial quantities will be found on both sides of the Purisima Fold.

#### Commercial Aspect.

The accessible location of the Field, favoring transportation and marketing is unequalled anywhere in the State.

The oil is of the best in the State, having as high a percentage of refinable products as any.



A decline in the price of petroleum or its products will effect the Half Moon Bay District to a less extent than other California Fields owing to its location near transportation and market.

The Field can be operated at a minimum cost; the refining can be done on the site of the wells; the marketing can be done direct to the retail trade in the Peninsula Region, or the products of the refinery can be readily sold through marketing agencies already established in San Francisco.

### Final Conclusions.

In the opinion of the writer, the future of the Half Moon Bay District depends entirely upon the proper development of the oil measures which exist beneath the area. The actual presence of adequate oil measures is considered proven by the small wells which have produced a very valuable oil in commercial quantity for a long period of time. Although these wells have been producing under adverse mechanical and geological conditions, the yield of oil has been steady, thus supporting the belief that they derive their supply from substantial oil measures and not from a freak accumulation.

The Half Moon Bay District has features that few other Fields in the State of California possess. The location near the highway where most of the products can be sold or sent to San Francisco market is exceptional. The high grade of the crude from which all of the most desirable petroleum products can be made is of paramount importance.

At present a well is being drilled to test out the new structure. If this well should discover oil in commercial quantity it will be an event of utmost importance to the Half Moon Bay Field. It will at once prove the presence of a considerable field. All of the land lying to the east of the well, as far as the seepages will be considered as practically proven.



To the west of the drilling well the probabilities are that oil will be found and that all of the land bordering the structure, perhaps as far as the ocean, will be oil land.

When the entire investment, including the leases and the cost of drilling two comparatively shallow wells is contrasted with the large gain that would result in the event of success, the bet appears to be a very good one, and has no comparison to the chances taken in wildcatting in Southern California.

It is the opinion of the writer that the Half Moon Bay land surveyed possesses exceptional possibilities and warrants thorough exploitation.

*Eric A. Starke*

Petroleum Engineer.







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